2006 ACCESSORIES & EQUIPMENT

Object Detection - Lucerne

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Rear Object Sensor Module Nut	9 N.m	80 lb in

SCHEMATIC AND ROUTING DIAGRAMS

OBJECT DETECTION SCHEMATICS

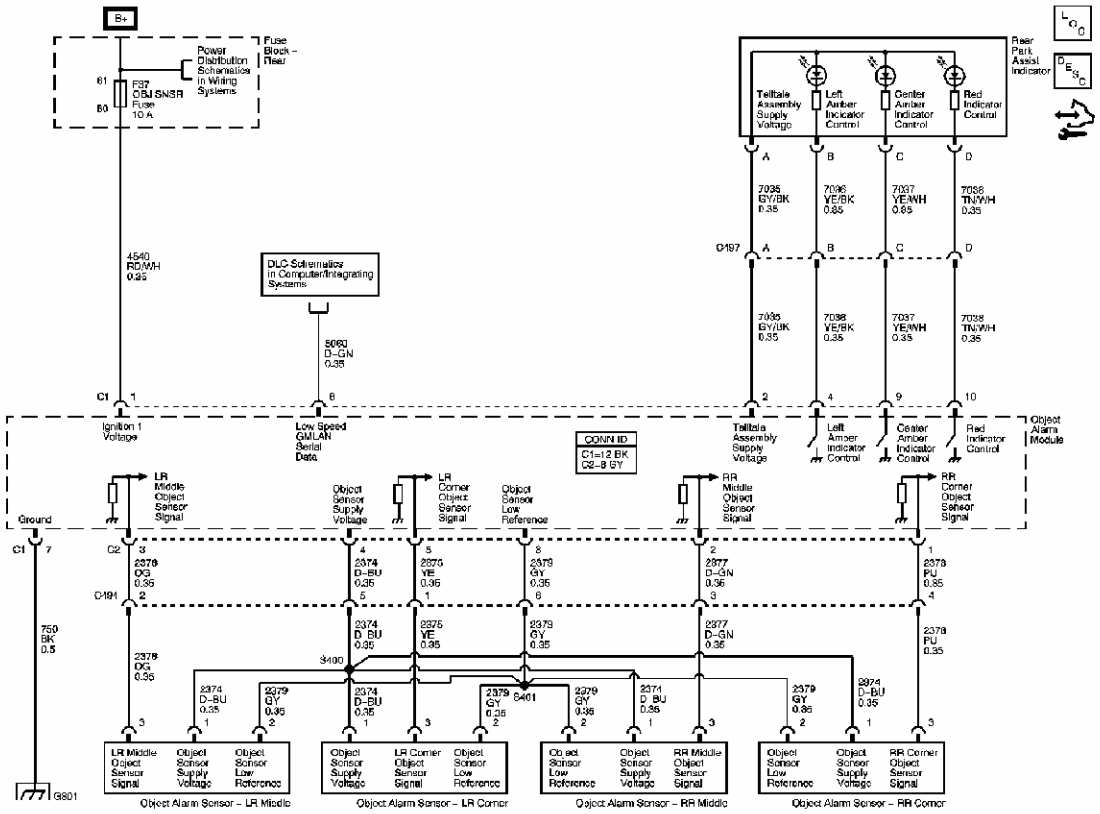

Fig. 1: Rear Park Assist Schematic - UD7
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

OBJECT DETECTION COMPONENT VIEWS

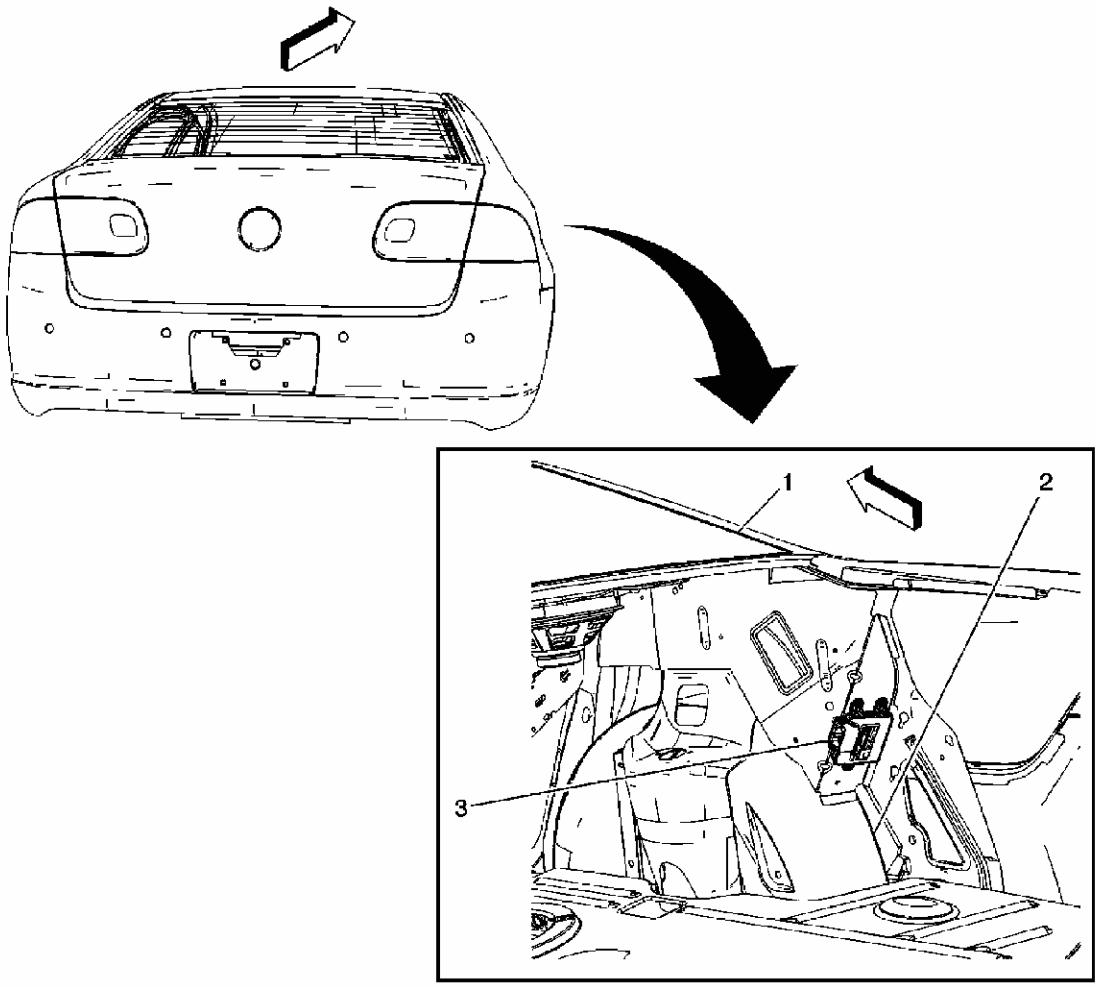

Fig. 2: View Behind Left Rear Seat
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Rear Window
2	Wheel Well - RR
3	Object Alarm Module (UFR)

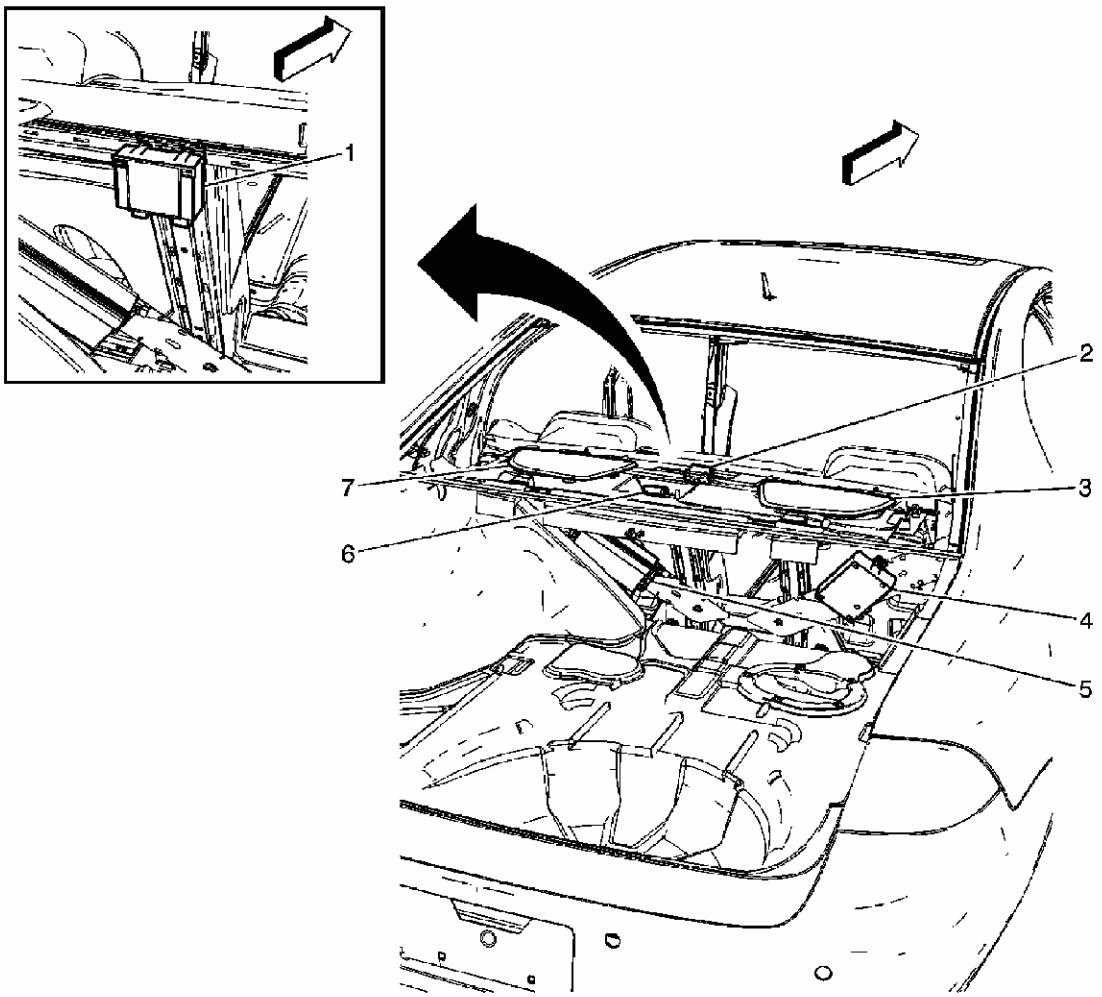

Fig. 3: View Behind Rear Seat
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Remote Control Door Lock Receiver (RCDLR)
2	Rear Park Assist Indicator (UD7)
3	Speaker - RR
4	Vehicle Communication Interface Module (VCIM) (UE1)
5	Amplifier (UQA)
6	Rear Compartment Courtesy Lamp
7	Speaker - LR

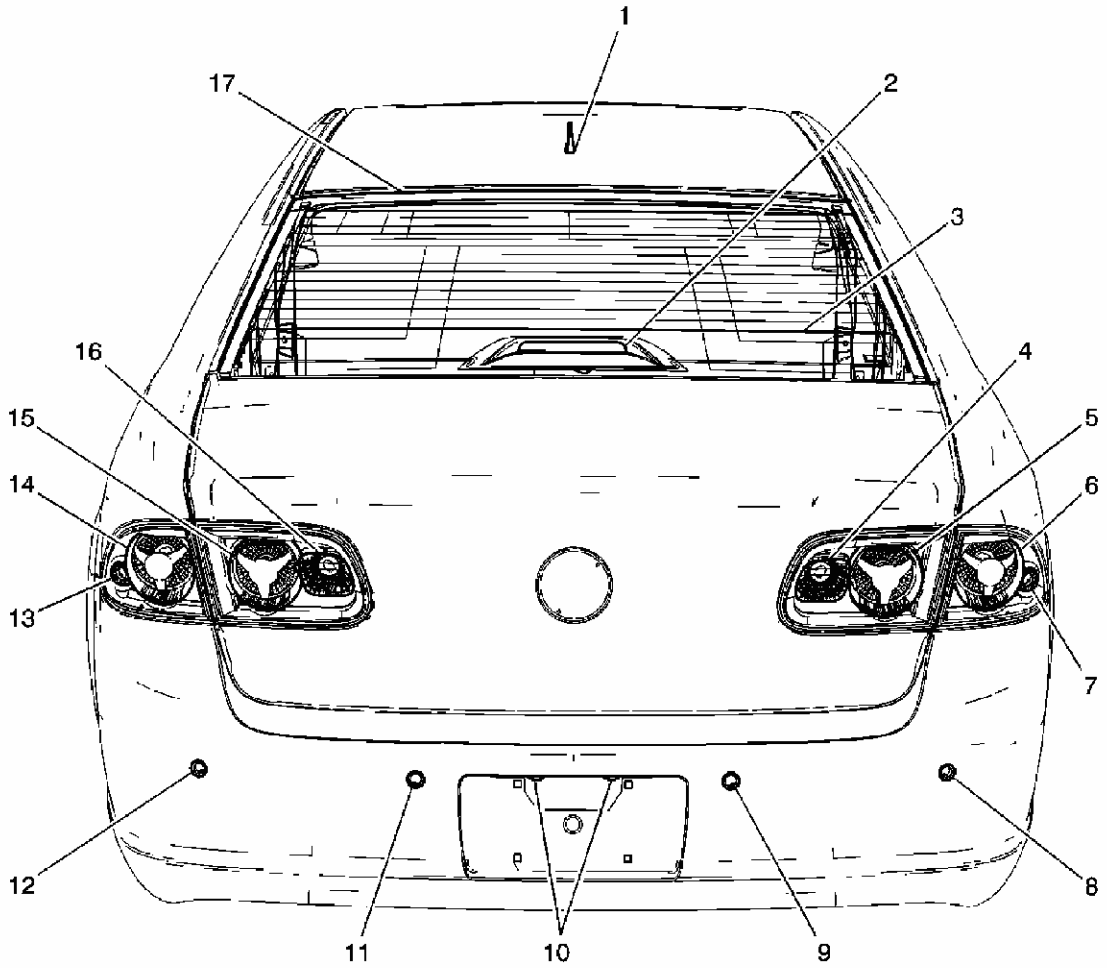

Fig. 4: View Of Rear Of Vehicle
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

Callout	Component Name
1	Cellular Navigation (UE1) and Digital Radio Antenna (U2K)
2	Center High Mounted Stop Lamp (CHMSL)
3	Rear Window Defogger
4	Backup Lamp - RR
5	Tail Lamp - Right Auxiliary
6	Stop/Turn Signal Lamp - RR
7	Marker Lamp - RR
8	Object Alarm Sensor - RR Corner (UFR)
9	Object Alarm Sensor - RR Middle (UFR)
10	License Lamps
11	Object Alarm Sensor - LR Middle (UFR)
12	Object Alarm Sensor - LR Corner (UFR)

13	Marker Lamp - LR
14	Object Alarm Sensor - LR Middle (UFR)
15	Object Alarm Sensor - LR Corner (UFR)
16	Backup Lamp - LR
17	Radio Rear Glass Antenna

OBJECT DETECTION CONNECTOR END VIEWS

Object Alarm Module C1

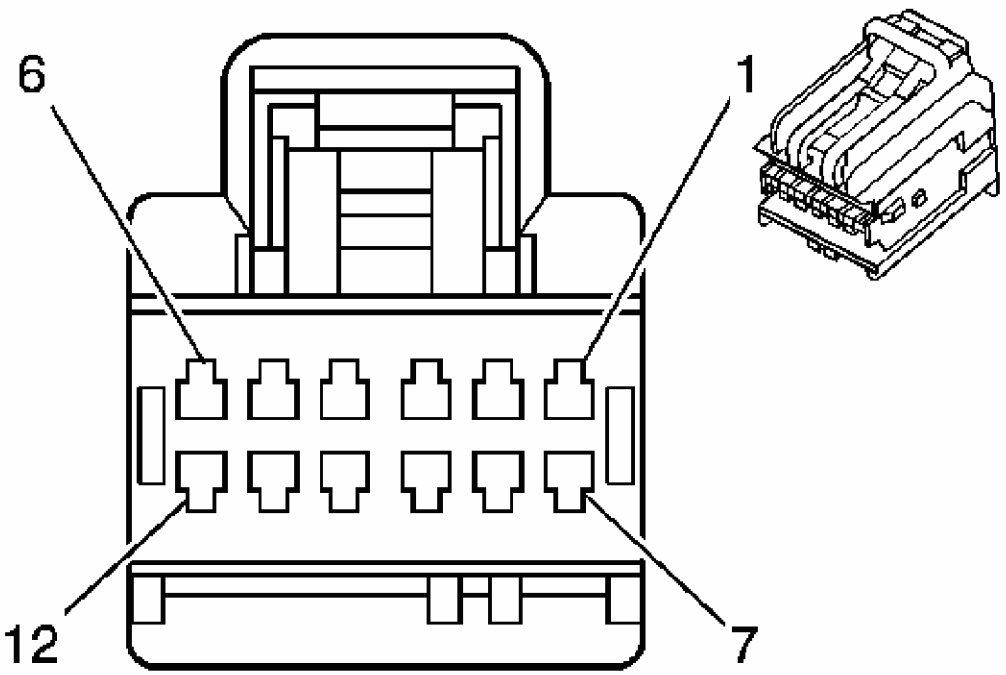

Fig. 5: Object Alarm Module C1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Object Detection Connector End Views

Connector Part Information

- OEM: 31410-1120
- Service: See Catalog
- Description: 12-Way F (BK)

Terminal Part Information

Connector Part Information

- Pins: 1, 2, 4, 6, 7, 9, 10
- Terminal/Tray: 7116-4618-02/14
- OEM: 31410-1120
- Core/Insulation Crimp: P/P
- Service: See Catalog
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)
- Description: 12-Way F (BK)

Object Alarm Module C1

Pin	Wire Color	Circuit No.	Function
1	RD/WH	4540	Ignition 1 Voltage
2	GY/BK	7035	Telltale Assembly Supply Voltage
3	-	-	Not Used
4	YE/BK	7036	Left Amber Indicator Control
5	-	-	Not Used
6	D-GN	5060	Low Speed GMLAN Serial Data
7	BK	750	Ground
8	-	-	Not Used
9	YE/WH	7037	Center Amber Indicator Control
10	TN/WH	7038	Red Indicator Control
11-12	-	-	Not Used

Object Alarm Module C2

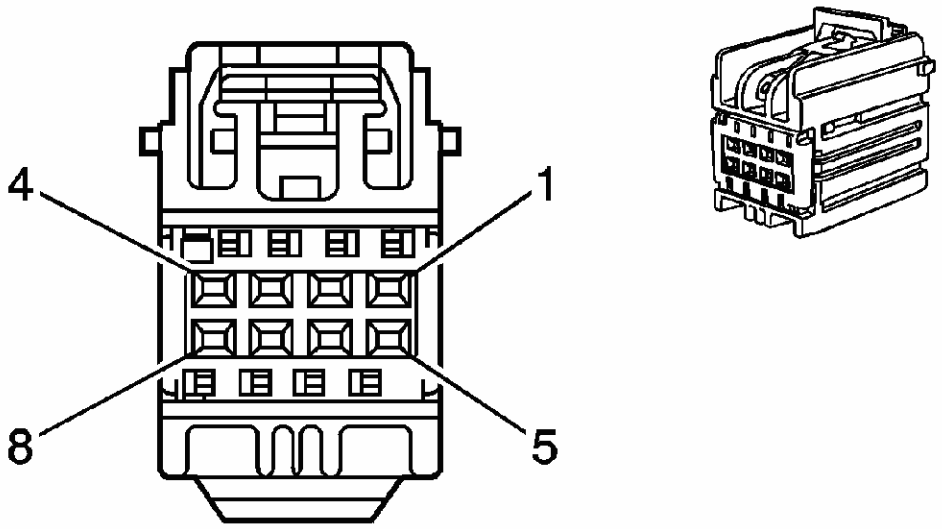

Fig. 6: Object Alarm Module C2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Object Detection Connector End Views

Connector Part Information

- OEM: 7283-9029-40
- Service: See Catalog
- Description: 8-Way F (GY)

Terminal Part Information

- Pins: 1, 2, 3, 4, 5, 8
- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Object Alarm Module C2

Pin	Wire Color	Circuit No.	Function
1	PU	2378	RR Corner Object Sensor Signal
2	D-GN	2377	RR Middle Object Sensor Signal
3	OG	2376	LR Middle Object Sensor Signal
4	D-BU	2374	Object Sensor Supply Voltage
5	YE	2375	LR Corner Object Sensor Signal
6-7	-	-	Not Used
8	GY	2379	Object Sensor Low Reference

Object Alarm Sensor - LR Corner

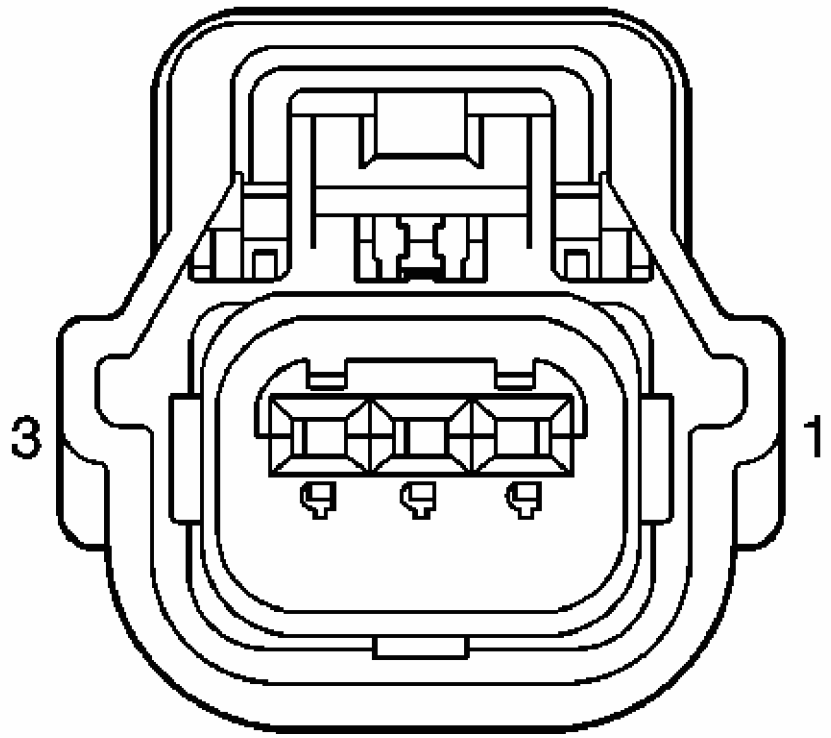

Fig. 7: Object Alarm Sensor - LR Corner Connector End View
Courtesy of GENERAL MOTORS CORP.

Object Detection Connector End Views

Connector Part Information

- OEM: 31403-3700
- Service: See Catalog
- Description: 3-Way F (BK)

Terminal Part Information

- Terminal/Tray: 33468-0001/23
- Core/Insulation Crimp: H/H
- Release Tool/Test Probe: J-38125-213/J-35616-64B (L-BU)

Object Alarm Sensor - LR Corner

Pin	Wire Color	Circuit No.	Function

Pin	Wire Color	Circuit No.	Object Sensor Supply Voltage
2	GY	2379	Object Sensor Low Reference
3	YE	2375	LR Corner Object Sensor Signal

Object Alarm Sensor - LR Middle

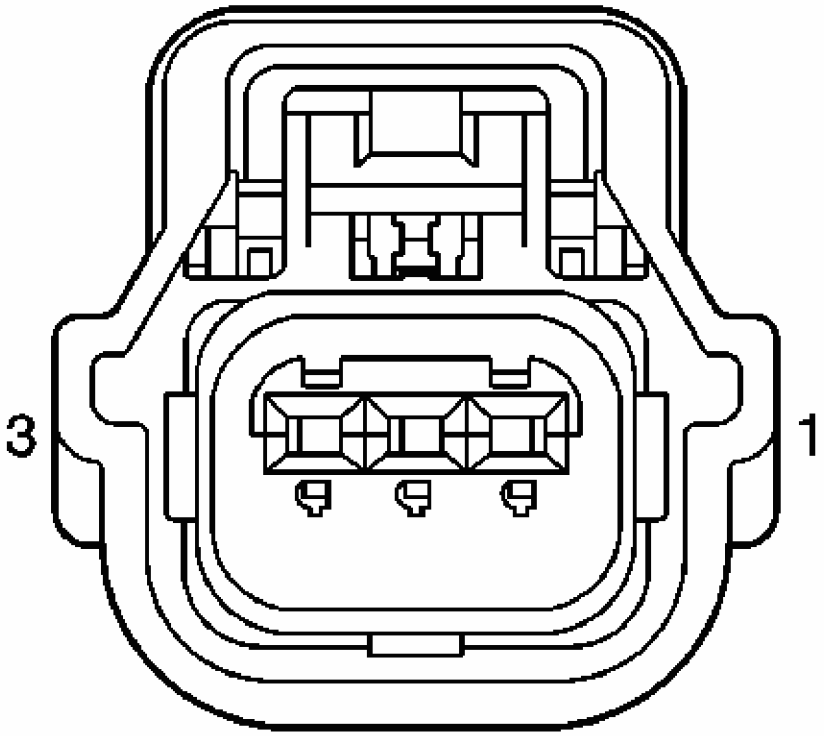

Fig. 8: Object Alarm Sensor - LR Middle Connector End View
Courtesy of GENERAL MOTORS CORP.

Object Detection Connector End Views

Connector Part Information

- OEM: 31403-3700
- Service: See Catalog
- Description: 3-Way F (BK)

Terminal Part Information

- Terminal/Tray: 33468-0001/23

Connector Part Information

- Release Tool/Test Probe: J-38125-213/J-35616-64B (L-BU)

Object Alarm Sensor - LR Middle

Pin	Wire Color	Circuit No.	Function
1	D-BU	2374	Object Sensor Supply Voltage
2	GY	2379	Object Sensor Low Reference
3	OG	2376	LR Middle Object Sensor Signal

Object Alarm Sensor - RR Corner

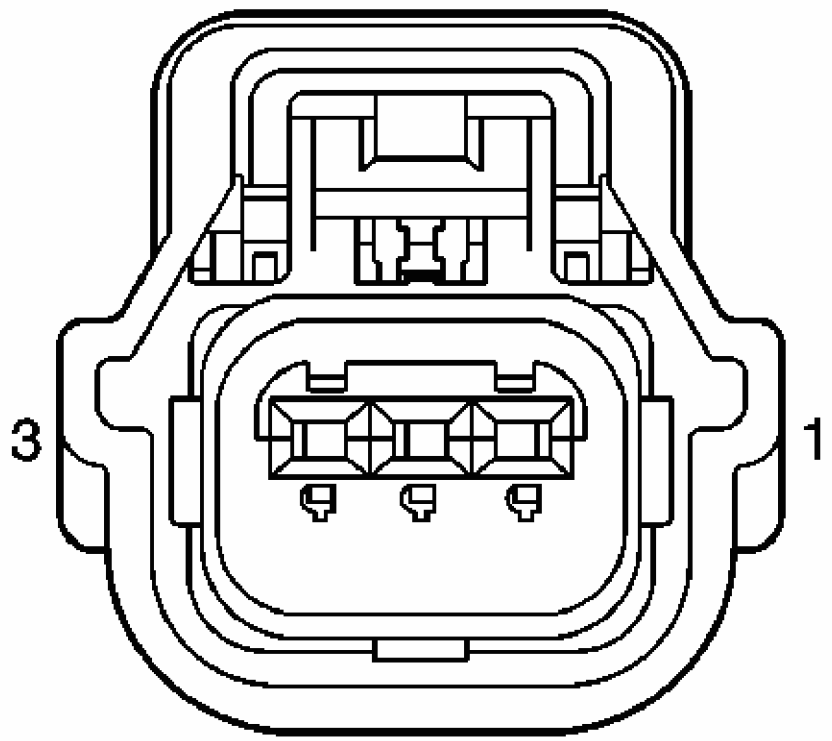

Fig. 9: Object Alarm Sensor - RR Corner Connector End View
Courtesy of GENERAL MOTORS CORP.

Object Detection Connector End Views

Connector Part Information

- OEM: 31403-3700

- Service: See Catalog
- Description: 3-Way F (BK)

Terminal Part Information

- Terminal/Tray: 33468-0001/23
- Core/Insulation Crimp: H/H
- Release Tool/Test Probe: J-38125-213/J-35616-64B (L-BU)

Object Alarm Sensor - RR Corner

Pin	Wire Color	Circuit No.	Function
1	D-BU	2374	Object Sensor Supply Voltage
2	GY	2379	Object Sensor Low Reference
3	PU	2378	RR Corner Object Sensor Signal

Object Alarm Sensor - RR Middle

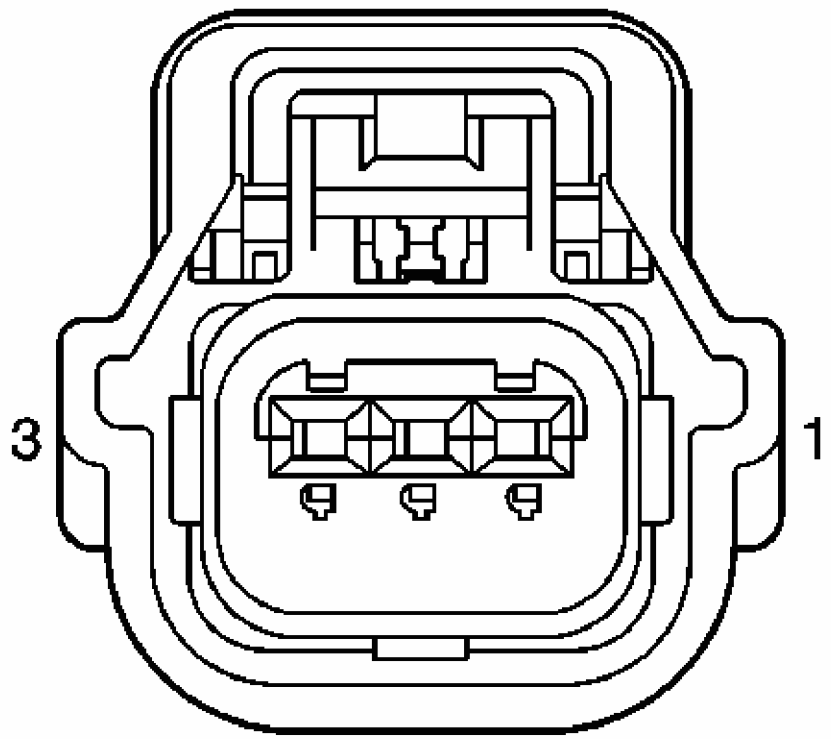

Fig. 10: Object Alarm Sensor - RR Middle Connector End View

Courtesy of GENERAL MOTORS CORP.

Object Detection Connector End Views

Connector Part Information

- OEM: 31403-3700
- Service: See Catalog
- Description: 3-Way F (BK)

Terminal Part Information

- Terminal/Tray: 33468-0001/23
- Core/Insulation Crimp: H/H
- Release Tool/Test Probe: J-38125-213/J-35616-64B (L-BU)

Object Alarm Sensor - RR Middle

Pin	Wire Color	Circuit No.	Function
1	D-BU	2374	Object Sensor Supply Voltage
2	GY	2379	Object Sensor Low Reference
3	D-GN	2377	RR Middle Object Sensor Signal

Rear Park Assist Indicator

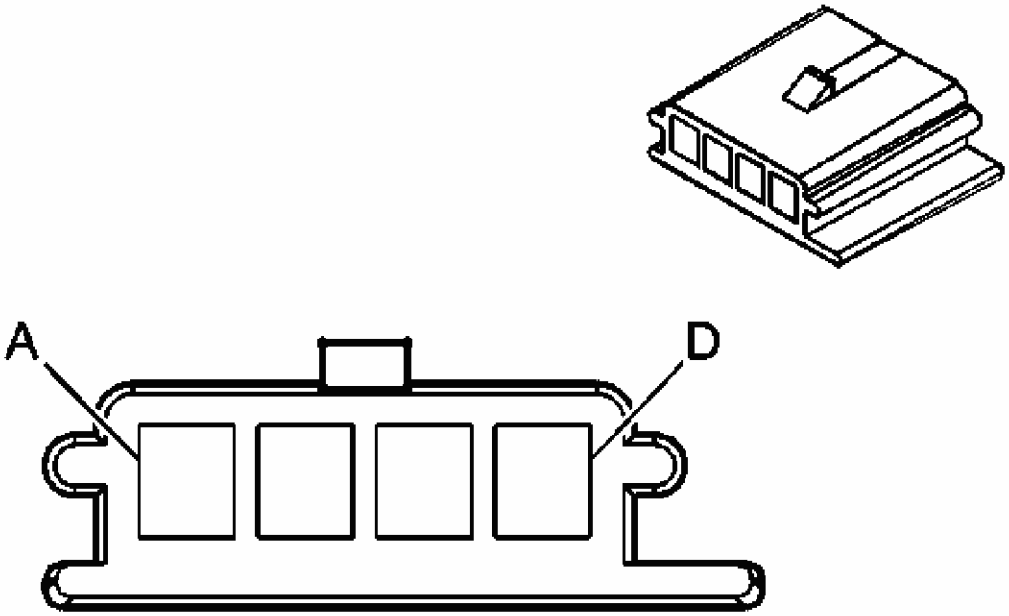

Fig. 11: Rear Park Assist Indicator Connector End View
Courtesy of GENERAL MOTORS CORP.

Object Detection Connector End Views

Connector Part Information

- OEM: 12045813
- Service: 12101889
- Description: 4-Way F Metri-Pack 150 Series (NAT)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-2A (GY)

Rear Park Assist Indicator

Pin	Wire Color	Circuit No.	Function
A	GY/BK	7035	Telltale Assembly Supply Voltage
B	YE/BK	7036	Left Amber Indicator Control
C	YE/WH	7037	Center Amber Indicator Control
D	TN/WH	7038	Red Indicator Control

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0953	** DESCRIPTION NOT COLLECTED **
DTC B0958, B0959, B0960 or B0961	** MULTIPLE VALUES **
DTC B0968	**DESCRIPTION NOT COLLECTED **
DTC B1008	**DESCRIPTION NOT COLLECTED **
DTC B1015	**DESCRIPTION NOT COLLECTED **
DTC B1E3A	**DESCRIPTION NOT COLLECTED **

DIAGNOSTIC STARTING POINT - OBJECT DETECTION

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** . The Diagnostic System Check will provide the following information:

- The identification of the control module which commands the system
- The ability of the control module to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of **Diagnostic System Check - Vehicle** , will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL DATA LIST

The scan tool data list contains all the object detection system related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The column, Data List, indicates the location of the parameter within the scan tool menu selections.

Use the object detection scan tool data list as directed by a diagnostic table or in order to supplement the diagnostic procedures. Begin all of the diagnostic procedures with the Diagnostic System Check - Vehicle. Use the scan tool data list after the following is determined:

- There is no published diagnostic trouble code (DTC) procedure nor published symptom procedure for the customer concern.
- The DTC or symptom diagnostic procedure indicated by the diagnostic system check does not resolve the customer concern.

The typical data values are obtained from a properly operating vehicle under the conditions

specified in the second row of the scan tool data list table. Comparison of the parameter values from the suspect vehicle with the typical data values may reveal the source of the customer concern.

Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Object Detection Enabled			
Battery Voltage Signal	Battery Data	Volts	0-19 V (Varies w/battery voltage)
Loudspeaker Feed Voltage Output	Battery Data	Volts/Counts	Varies
Park Assist Disable History (1-8)	History Data	Empty/Manual Disable/Park Brake/Hitch Object Attached/Reverse Overspeed/Inhibit/Sensor Disturbance/Snow,Ice,Mud/Sensor Ring Time	Empty
Park Assist Front Display LED CKT	Battery Data	Ok/Over Current	Ok
Park Assist Front Y1 LED	System Data	Off/On	Off
Park Assist Front Y2 LED	System Data	Off/On	Off
Park Assist Front Red LED	System Data	Off/On	Off
Park Assist Switch	System Data	Active/Inactive	Active
Park Assist Switch LED	System Data	Off/On	Off
Park Assist Switch LED CKT	Battery Data	Ok/Over Current	Ok
Park Assist Rear Display LED CKT	Battery Data	Ok/Over Current	Ok
Park Assist Rear Y1 LED	System Data	Off/On	Off
Park Assist Rear Y2 LED	System Data	Off/On	Off
Park Assist Rear Red LED	System Data	Off/On	Off

Park Assist Disable History Status		System Data		Empty/Manual Disable/Park Brake/Hitch Object Attached/Reverse Overspeed/Inhibit/Sensor Disturbance/Snow,Ice,Mud/Sensor Ring Time/Enable/Disable/Inhibit/Failed/Blocked		Enable Empty
Power Mode		System Data		Off/Accessory/Run/Crank Request		Run
Park Assist Front Display LED CKT		Battery Data		Ok/Over Current		Ok
Park Assist Front LED		Alarm Data		No Detect/Zone 1/Zone 2/Zone 3/Zone 4/Zone 5/Zone 6/Zone 7/Zone 8		No Detect
Park Assist Front LED		System Data		Off/On		Off
Park Assist Front Sensor Output		Battery Data		Volts/Counts		Varies
Park Assist Front Red LED		System Data		Off/On		Off
Vehicle Speed		System Data		mph (km/h)		0 mph (0 km/h)

SCAN TOOL DATA DEFINITIONS

The scan tool data definitions contain a brief description of all object detection system related parameters available on the scan tool. The parameters that are available on the scan tool are listed below in alphabetical order.

Battery Voltage

The scan tool displays 0 -19 volts. This is the system battery voltage as detected by the object alarm module.

Loudspeaker Feed Voltage Output

The scan tool displays voltage/counts. This is the radio loudspeaker feed voltage/counts output as monitored by the object alarm module.

Park Assist Disable History (1 - 8)

The scan tool displays Empty/Manual Disable/Park Brake/Hitch Object Attached/Reverse Overspeed/Inhibit/Sensor Disturbance/Snow,Ice,Mud/Sensor Ring Time. The object alarm module maintains 8 history data for the park assist system at all times. This data represents the last 8 reasons why the park assist system was disabled.

Park Assist Switch

The scan tool displays Active/Inactive. This is the state of the park assist switch as detected by the object alarm module.

Park Assist Switch LED

The scan tool displays Off/On. This is the state of the park assist switch LED.

Park Assist Switch LED CKT

The scan tool displays Ok/Over Current. This is the status of the park assist switch LED circuit as monitored by the object alarm module.

Park Assist Front Display LED CKT

The scan tool displays Ok/Overcurrent. This is the status of the park assist front display LED circuit as monitored by the object alarm module.

Park Assist Front Y1 LED

The scan tool displays Off/On. This is the state of the park assist front Y1 LED as detected by the object alarm module.

Park Assist Front Y2 LED

The scan tool displays Off/On. This is the state of the park assist front Y2 LED as detected by the object alarm module.

Park Assist Front Red LED

The scan tool displays Off/On. This is the state of the park assist front red LED as detected by the object alarm module.

Park Assist Rear Display LED CKT

The scan tool displays Ok/Overcurrent. This is the status of the park assist rear display LED circuit as monitored by the object alarm module.

Park Assist Rear Y1 LED

The scan tool displays Off/On. This is the state of the park assist rear Y1 LED as detected by the object alarm module.

Park Assist Rear Y2 LED

The scan tool displays Off/On. This is the state of the park assist rear Y2 LED as detected by the object alarm module.

Park Assist Rear Red LED

The scan tool displays Off/On. This is the state of the park assist rear red LED as detected by the object alarm module.

Park Assist System Status

The scan tool displays Enable/Disable/Inhibit/Failed/Blocked. This is the status of the park assist system as monitored by the object alarm module.

Power Mode

The scan tool displays Off/Accessory/Run/Crank Request. This is the status of the vehicle power mode as detected by the object alarm module.

Rear Region (1 - 4)

The rear object detection system field of view is divided into 4 regions as displayed in the scan tool. The scan tool displays No Detect/Zone 1/Zone 2/Zone 3/Zone 4/Zone 5/Zone 6/Zone 7/Zone 8 for each of the 4 regions. The object alarm module translates the object of interest distance data into specific range zones.

Sensor Feed Voltage Output

The scan tool displays voltage/counts. This is the object sensor feed voltage/counts output as monitored by the object alarm module.

Vehicle Speed

The scan tool displays mph (km/h). This is the vehicle speed as detected by the object alarm module. The object alarm module receives vehicle speed information from the ECM.

DTC B0953

DTC Descriptor

DTC B0953 00

Parking Aid Radio Output Circuit (No radio option)

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

DTC B0953

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Parking Aid Radio Output					

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Parking Aid Radio Circuit	B0953 00	B0953 00	B0953 00	B0953 00	B0953 00
Ground Circuit					

Circuit/System Description

The object alarm detection system senses how close the vehicle is to an object. The distance is determined by the 4 ultrasonic sensors located in the rear bumper. The object detection system operates only at speeds less than 5 mph (8 km/h), which make parking easier and helps you avoid colliding with objects such as parked vehicles. The object detection system will notify the driver when backing up while parking at speeds less than 5 mph (8 m/h). The object detection system will use serial data communications to communicate with the radio to chime through the speakers along with the park assist indicators for notification. This DTC will only set if the vehicle does not come equipped with a radio from the factory then the object alarm detection system will use an external dedicated speaker.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

The object alarm module signal circuit is shorted to battery, short to ground or an open condition existing for 300 milliseconds.

Action Taken When the DTC Sets

- The object alarm module sets a DTC.
- The object alarm module commands ON the information center telltale red indicator.
- The object alarm module will send a serial data communication message to the instrument panel (I/P) to scroll SERVICE PARK ASSIST message on the driver information center (DIC) and the chime will try to sound.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Object Detection Connector End Views

Electrical Information Reference

- Circuit Testing

- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Diagnostic Aids

This DTC will only set if the vehicle does not come equipped with a radio from the factory then the object alarm detection system will use an external dedicated speaker.

Circuit/System Testing

IMPORTANT: When removing connectors inspect for damage or corrosion. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- **The external speaker**
- **The object alarm module**
- **The external speaker wiring harness connector**
- **The object alarm module wiring harness connector**

1. Ignition OFF, if DTC B0953 is current, disconnect the external speaker connector.
2. Remove the object alarm module connector. Refer to **Object Alarm Module Replacement** in Repair Instructions for connector location.
3. Test both speaker circuits between the object alarm module and the speaker. Verify that a short to voltage, short to ground or open/low resistance does not exist.
   - If any of the above conditions are found make the appropriate repair.
4. Reconnect all components. Ignition ON, use the scan tool to clear the DTCs then recheck for DTCs. Verify DTC B0953 does not set.
   - If DTC B0953 was current replace the external speaker. After replacement refer to **Repair Verification**.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for Object Alarm Module Replacement, setup and programming

Repair Verification

Ignition ON, use the scan tool to clear the DTCs then recheck for DTCs. Verify no DTCs are set.

- If DTC B0953 was current replace the object alarm module.

DTC B0958, B0959, B0960 OR B0961

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B0958 01

Parking Aid Rear Sensor 1 (Left Corner) Circuit-Short to Battery

DTC B0958 06

Parking Aid Rear Sensor 1 (Left Corner) Circuit-Short to Ground or Open

DTC B0958 08

Parking Aid Rear Sensor 1 (Left Corner) Circuit-Signal Invalid

DTC B0958 21

Parking Aid Rear Sensor 1 (Left Corner) Circuit-Incorrect Period

DTC B0959 01

Parking Aid Rear Sensor 2 (Left Middle) Circuit-Short to Battery

DTC B0959 06

Parking Aid Rear Sensor 2 (Left Middle) Circuit-Short to Ground or Open

DTC B0959 08

Parking Aid Rear Sensor 2 (Left Middle) Circuit-Signal Invalid

DTC B0959 21

Parking Aid Rear Sensor 2 (Left Middle) Circuit-Incorrect Period

DTC B0960 01

Parking Aid Rear Sensor 3 (Right Middle) Circuit-Short to Battery

DTC B0960 06

Parking Aid Rear Sensor 3 (Right Middle) Circuit-Short to Ground or Open

DTC B0960 08

Parking Aid Rear Sensor 3 (Right Middle) Circuit-Signal Invalid

DTC B0960 21

Parking Aid Rear Sensor 3 (Right Middle) Circuit-Incorrect Period

DTC B0961 01

Parking Aid Rear Sensor 4 (Right Corner) Circuit-Short to Battery

DTC B0961 06

Parking Aid Rear Sensor 4 (Right Corner) Circuit-Short to Ground or Open

DTC B0961 08

Parking Aid Rear Sensor 4 (Right Corner) Circuit-Signal Invalid

DTC B0961 21

Parking Aid Rear Sensor 4 (Right Corner) Circuit-Incorrect Period

Diagnostic Fault Information

DTC B0958, B0959, B0960 or B0961

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
Left Rear Sensor 1 Signal	B0958 06	B0958 06	B0958 01	B0958 08 B0958 21
Left Rear Sensor 1 Low Reference	-	B0958 06	B0958 01	B0958 08 B0958 21
Left Middle Rear Sensor 2 Signal	B0959 06	B0959 06	B0959 01	B0959 08 B0959 21

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
Left Middle Rear Sensor 2 Low Reference	-	B0959 06	B0959 01	B0959 08 B0959 21
Right Middle Rear Sensor 3 Signal	B0960 06	B0960 06	B09506 01	B0960 08 B0960 21
Left Rear Sensor 1 Signal	B0958 06	B0958 06	B0958 01	B0958 08 B0958 21
Right Middle Rear Sensor 3 Low Reference	-	B0960 06	B0960 01	B0960 08 B0960 21
Left Rear Sensor 1 Low Reference	-	B0958 06	B0958 01	B0958 08 B0958 21
Right Rear Sensor 4 Signal	B0961 06	B0961 06	B0961 01	B0961 08 B0961 21
Left Middle Rear Sensor 2	B0959 06	B0959 06	B0959 01	B0959 08
Right Rear Sensor 4 Low Reference	-	B0961 06	B0961 01	B0961 08 B0961 21

Circuit/System Description

The object alarm system monitors the distance and how close a vehicle is to an object when backing up in a parking maneuver. The object alarm system will notify the driver of any objects of interest when backing up at speeds less than 8 km/h (5 mph). The distance between a vehicle and an object of interest is monitored by the 4 ultrasonic sensors located in the rear bumpers of the vehicle. The object alarm sensors receive the echo signal reflected off an object of interest while the vehicle is backing up at speeds less than 8 km/h (5 mph). The object alarm system uses visual displays and audible warnings from the radio speakers to warn the driver of an object of interest within the defined field of view. The visual display comprises of two amber and one red indicators and these indicators illuminate based on the vehicle distance to the object of interest. The object alarm sensor is a three wire sensor comprising of the supply voltage circuit, signal circuit and the low reference circuit. Power and ground is provided to the object alarm sensor via the supply voltage circuit and low reference from the object detection alarm module. The typical object alarm sensor signal voltage when the system is active is between 7.2 V-9.2 V.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

B0958 01, B0959 01, B0960 01 or B0961 01

The object alarm module circuit is short to battery.

B0958 06, B0959 06, B0960 06 or B0961 06

The object alarm module circuit is short to ground or open.

B0958 08, B0959 08, B0960 08 or B0961 08

The object alarm module signal circuit is invalid.

B0958 21, B0959 21, B0960 21 or B0961 21

The object alarm module has an incorrect period.

Action Taken When the DTC Sets

- The object alarm module commands ON the information center telltale red indicator.
- The object alarm module sends a serial data communication message to the instrument panel cluster (IPC) to display SERVICE PARK ASSIST message in the driver information center (DIC) and the chime will sound.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Object Detection Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector of the suspect rear object alarm sensor.
2. Test for less than 1.0 ohm of resistance between the low reference circuit and ground.
    - If greater than 1.0 ohm, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the rear object alarm module.
3. Ignition ON with the transmission in reverse, test for 8.2 V-8.8 V between the rear object alarm sensor supply voltage circuit and the low reference circuit.
    - If greater than 8.8 V, test the supply voltage circuit for a short to voltage. If the circuit tests normal, replace the object alarm module.
    - If less than 8.2 V, test the supply voltage circuit for a short to ground or an

open/high resistance. If the circuit tests normal, replace the rear object alarm module.

4. Ignition ON with the transmission in reverse, test for 7.2 V-9.2 V between the rear object alarm sensor signal circuit and the low reference circuit.
   - If greater than 9.2 V, test the signal circuit for a short to voltage. If the circuit tests normal, replace the rear object alarm module.
   - If less than 7.2 V, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the rear object alarm module.
5. If all circuits test normal, replace the suspect rear object alarm sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Rear Object Sensor Replacement**
- **Control Module References** for the object alarm module replacement, setup and programming

DTC B0968

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B0968 00

Parking Aid Indicator Circuit Short to Ground

Diagnostic Fault Information

DTC B0968

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
Information Center Indicator Supply Voltage Circuit	B0968	1	-	-
Information Center Indicator Control Circuits (Rear Left	B0968	1	1	-

Amber, Center Amber and Red Indicator) 1. Information Center Telltale Malfunction				

Circuit/System Description

The object alarm system senses how close the vehicle is to an object. The distance is determined by the 4 ultrasonic sensors located in the rear bumpers. The object detection system will notify the driver when backing up while parking at speeds less than 8 km/h (5 mph). The object alarm system makes parking easier and helps avoid colliding with objects such as parked vehicles. The object alarm system will use the telltale assembly information center indicators and the radio speakers to notify the driver when an object is within the object alarm system field of view. Power is provided to the telltale assembly information center by the object alarm module via the telltale assembly supply voltage circuit. The telltale assembly information center indicators are controlled by the object alarm module via the indicator control circuits. The object alarm module provides the ground for the indicator control circuits.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

- The object alarm module has detected that the telltale assembly supply voltage circuit for the rear park assist indicator is shorted to ground.
- The rear object alarm module has detected that one of the three indicator control circuits for the rear park assist is shorted to ground.

Action Taken When the DTC Sets

- The object alarm module commands ON the telltale assembly information center red indicator and disables the object detection system.
- The object alarm module will send a serial data message to the instrument panel cluster (IPC) to display SERVICE PARK ASSIST message in the driver information center (DIC) and a chime will sound from the radio speakers.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Object Detection Connector End Views

Description and Operation

Object Detection Description and Operation (Rear Park Assist)

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Circuit/System Verification

The red indicator displays continuously in the rear or front telltale assembly information center. If red indicator is not flashing, check if DTC is history.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the telltale assembly information center.
2. Ignition ON, place the transmission in reverse. Verify a test lamp illuminates when connected between the supply voltage circuit terminal A and ground.
    - If the test lamp does not illuminate, test the supply voltage circuit for a short to ground or an open/high resistance.
3. Ignition ON, scan tool installed, place the transmission in reverse. Verify that a test lamp illuminates when connected between the supply voltage circuit terminal A and each indicator control circuit terminals B, C and D while performing the scan tool special functions LED test.
    - If the test lamp does not illuminate for one or more indicator control circuits, test the suspect indicator control circuit for a short to ground or an open/high resistance. If all the circuit(s) test normal, replace the telltale assembly information center.
4. If all circuits test normal, test or replace the object alarm module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- Information Center Telltale Assembly Replacement

- **Control Module References** for object alarm module replacement, setup and programming

DTC B1008

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1008 42

Calibration Data Not Programmed

Circuit/System Description

When the ignition is turned ON, the object alarm module performs a self test to verify if any critical malfunction exists within the system. When the object alarm system has completed the power-up mode, the object alarm module establishes communication with the body control module (BCM). During the power-up mode the object alarm module checks for a valid calibration data set, if no valid calibration data set is found, the object alarm module disables the system and commands the red indicator ON.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

When the calibration data set is not programmed in the object alarm module upon startup.

Action Taken When the DTC Sets

- The object alarm module commands ON the information center telltale red indicator.
- The object alarm module sends a serial data communication message to the instrument panel cluster (IPC) to display SERVICE PARK ASSIST message on the driver information center (DIC) and the chime will sound.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.

- The history DTC clears after 40 malfunction-free warm-up cycles.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Object Detection Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

Ignition ON, scan tool installed, verify that DTC B1008 is a history code

- If DTC B1008 is current, perform the programming and setup procedure for the front or rear object alarm module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for object alarm module replacement, setup and programming

DTC B1015

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1015 00

Vehicle Identification Number (VIN) Information Error

Circuit/System Description

When the ignition is turned ON, the object alarm module receives and stores the vehicle identification number (VIN) from the body control module (BCM). The BCM sends serial data messages to the object alarm module with the VIN information. The object alarm module will compare the VIN received to VIN stored in memory. If the VIN stored in memory does not match the VIN transmitted by the BCM, the object alarm module sets a DTC and commands the red indicator ON to indicate a system malfunction.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

- The object detection module VIN digits does not match the digits stored in the BCM.
- The VIN stored in the BCM does not match the vehicle VIN.

Action Taken When the DTC Sets

- The object alarm system is disabled.
- The object alarm module commands ON the information center telltale red indicator.
- The object alarm module will send a GMLAN serial data message to the instrument panel Cluster (IPC) to display SERVICE PARK ASSIST message on the driver information center (DIC) and the chime will sound.

Conditions for Clearing the DTC

The VIN stored in the object alarm module matches the VIN stored in the BCM.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Object Detection Connector End Views

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Circuit/System Testing

Ignition ON, scan tool installed, verify that DTC B1015 is a history code and verify that there is no VIN mismatch with the BCM, object alarm module and the vehicle VIN.

- If any VIN mismatch exists, program the module with the correct VIN.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for the BCM and object alarm module replacement, setup and programming

DTC B1E3A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1E3A 03

Sensor Power Circuit Voltage Below Threshold

DTC B1E3A 07

Sensor Power Circuit Voltage Above Threshold

Circuit/System Description

The object alarm detection system senses how close the vehicle is to an object. The distance is determined by the 4 ultrasonic sensors located in the rear and front (if equipped) bumpers. The object detection system will notify the driver when backing up while parking at speeds less than 8 km/h (5 mph), which make parking easier and helps you avoid colliding with objects such as parked vehicles. The object detection system will use front and rear display indicators and the radio speakers for notification.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

B1E3A 03

The object alarm module has detected the object alarm sensor supplied voltage circuit is below 7.2 volts.

B1E3A 07

The object alarm module has detected the object alarm sensor supplied voltage circuit is above 9.2 volts.

Action Taken When the DTC Sets

- The object alarm module sets a DTC.
- The object alarm module commands ON the information center telltale red indicator.
- The object alarm module will send a serial data communication message to the instrument panel (I/P) to scroll SERVICE PARK ASSIST message on the driver information center (DIC) and the chime will sound.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The object alarm module receives a clear code command from the scan tool.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Object Detection Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

1. Ignition ON and the scan tool installed, verify that DTC B1325 is not current.
   - If current, refer to **DTC B1325** .

2. Ignition ON and the scan tool installed, verify that DTC B0958, B0959, B0960 or B0961 is not current.
   - If current, refer to **DTC B0958, B0959, B0960 or B0961**.
3. Ignition ON and with the transmission range in REVERSE, verify that the scan tool Sensor Feed Voltage Output parameter is between 7.2 V - 9.2 V.
   - If less than 7.2 V, test the supply voltage circuit of the object alarm sensor for a short to ground or an open/high resistance. If the circuit tests normal, replace the rear object alarm module.
   - If greater than 9.2 V, test the supply voltage circuit of the object alarm sensor for a short to voltage. If the circuits test normal, replace the object alarm module.
4. If all circuits test normal, test or replace the suspect object alarm sensor for the rear or front object alarm system.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for object alarm module replacement, setup and programming

SYMPTOMS - OBJECT DETECTION

IMPORTANT: Review the system operation in order to familiarize yourself with the system functions. Refer to Object Detection Description and Operation (Rear Park Assist).

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Make sure the rear parking assist sensors located on the vehicle rear bumper are clear. Remove any snow, mud or ice that is blocking the sensors.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Information Center Telltale Malfunction

INFORMATION CENTER TELLTALE MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Information Center Telltale Malfunction

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
Information Center Indicator Supply Voltage Circuit	B0968	1	-	-
Information Center Indicator Control Circuits (Rear Left Amber, Center Amber and Red Indicator)	B0968	1	1	-
1. Information Center Telltale Malfunction				

Circuit/System Description

The object alarm system senses how close the vehicle is to an object. The distance is determined by the 4 ultrasonic sensors located in the rear bumpers. The object detection system will notify the driver when backing up while parking at speeds less than 8 km/h (5 mph). The object alarm system makes parking easier and helps avoid colliding with objects such as parked vehicles. The object alarm system will use the telltale assembly information center indicators and the radio speakers to notify the driver when an object is within the object alarm system field of view. Power is provided to the telltale assembly information center by the object alarm module via the telltale assembly supply voltage circuit. The telltale assembly information center indicators are controlled by the object alarm module via the indicator control circuits. The object alarm module provides the ground for the indicator control circuits.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Object Detection Connector End Views

Description and Operation

Object Detection Description and Operation (Rear Park Assist)

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

- Scan Tool Data List
- Scan Tool Data Definitions

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the object alarm module.
2. Ignition ON, with the telltale assembly supply voltage circuit connected to B+, verify that each telltale assembly indicator illuminates when each indicator control circuit terminal(s) B, C and D is connected to ground.
    - If one or two indicators of the telltale assembly does not illuminate, test the control circuit(s) for a short to ground or an open/high resistance. If the circuit(s) test normal, replace the telltale assembly information center.
    - If all the indicators of the telltale assembly does not illuminate, test the supply voltage circuit for a short to ground or an open/high resistance. If the circuit(s) test normal, replace the telltale assembly information center.
3. If all circuits test normal, test or replace the rear object alarm module.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Information Center Telltale Assembly Replacement
- Control Module References for the object alarm module replacement, setup and programming

REPAIR INSTRUCTIONS

INFORMATION CENTER TELLTALE ASSEMBLY REPLACEMENT

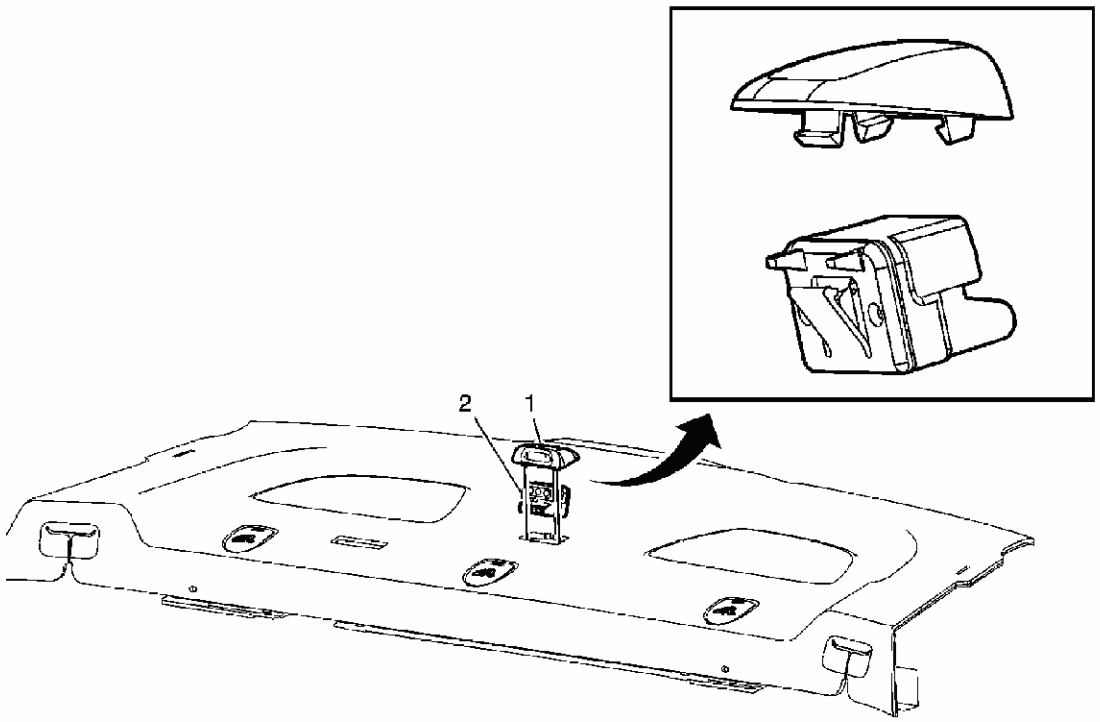

Fig. 12: Identifying Information Center Telltale Assembly
Courtesy of GENERAL MOTORS CORP.

Information Center Telltale Assembly Replacement

Callout	Component Name
Preliminary Procedures: Remove the right rear compartment side trim panel. Refer to **Rear Compartment Trim Panel Replacement** .	
1	Information Center Telltale Assembly Bezel **Tip:** Using a flat bladed tool from inside the trunk separate the bezel side tabs from the module and pull up and forward to release the bezel.
2	Information Center Telltale Module Assembly 1. Push up from the bottom through the top of the rear shelf trim. 2. Disconnect the electrical connector.

REAR OBJECT SENSOR REPLACEMENT

Removal Procedure

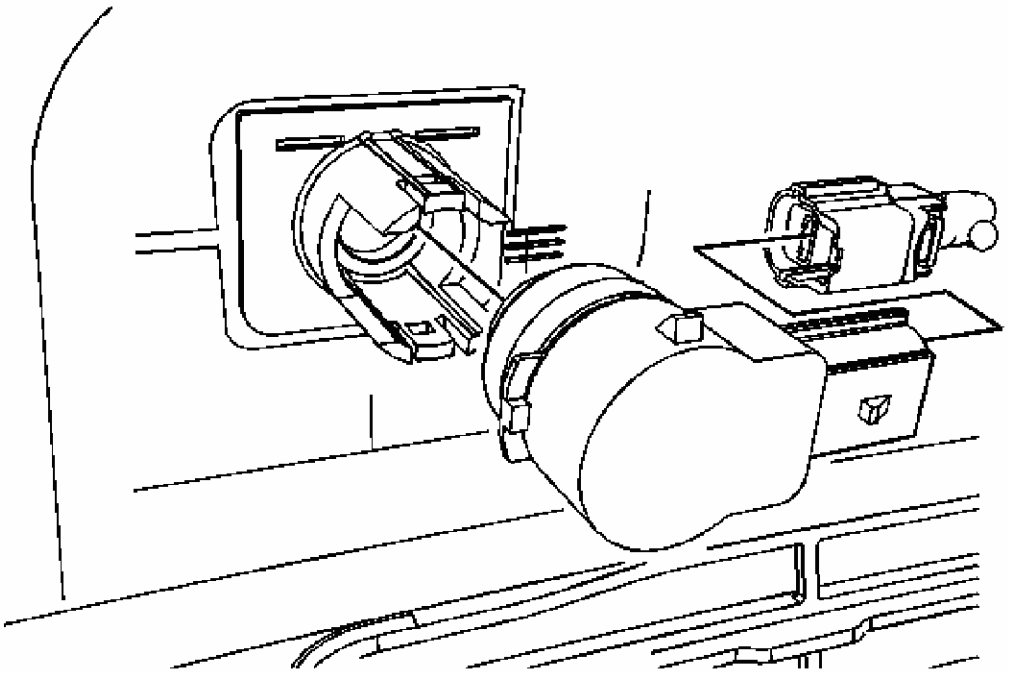

Fig. 13: View Of Rear Object Sensor
Courtesy of GENERAL MOTORS CORP.

1. Remove rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .
2. Disconnect electrical from the rear object sensor.
3. Lift the locking tabs on the housing and remove the rear object sensor.

Installation Procedure

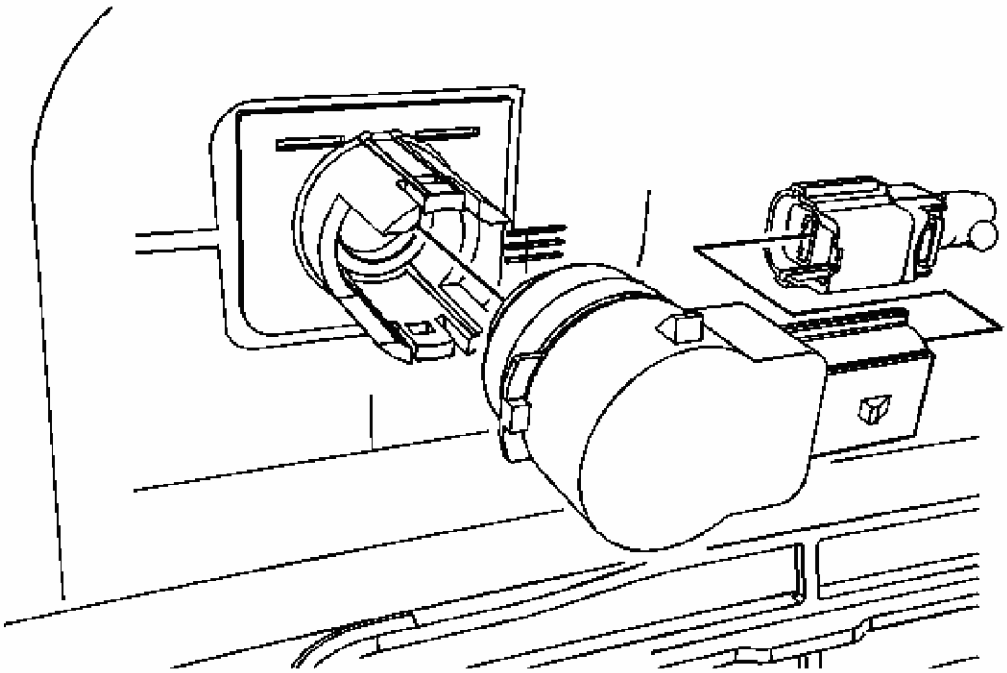

Fig. 14: View Of Rear Object Sensor
Courtesy of GENERAL MOTORS CORP.

1. Insert the sensor into the housing.
2. Connect the electrical connector to the rear object sensor.
3. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .

REAR OBJECT SENSOR HOUSING REPLACEMENT

Procedure

1. Remove the rear fascia. Refer to **Rear Bumper Fascia Replacement** .

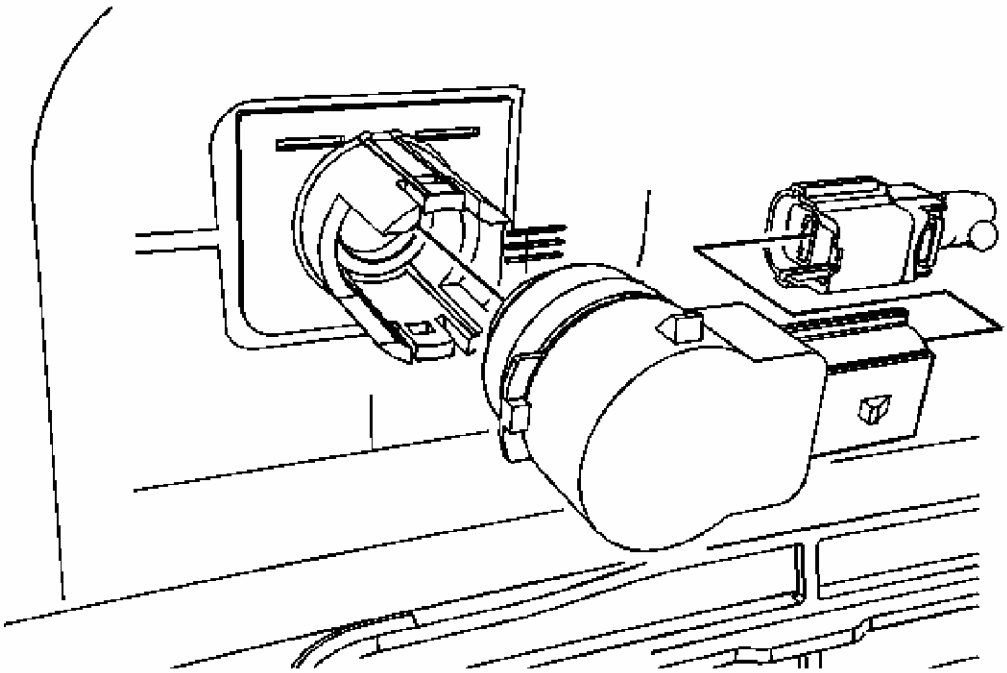

Fig. 15: View Of Rear Object Sensor
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the sensor harness.
3. Remove the sensor from the sensor housing.

IMPORTANT: Do not refinish previously painted sensors. Excessive paint build up will cause the sensor to be inoperative.

4. Paint the new sensor. Refer to **Basecoat/Clearcoat Paint Systems**
5. Inspect the paint thickness to ensure it does not exceed 6 mm using a paint thickness gauge suitable for non-ferrous metals. Refer to **Paint Gages**

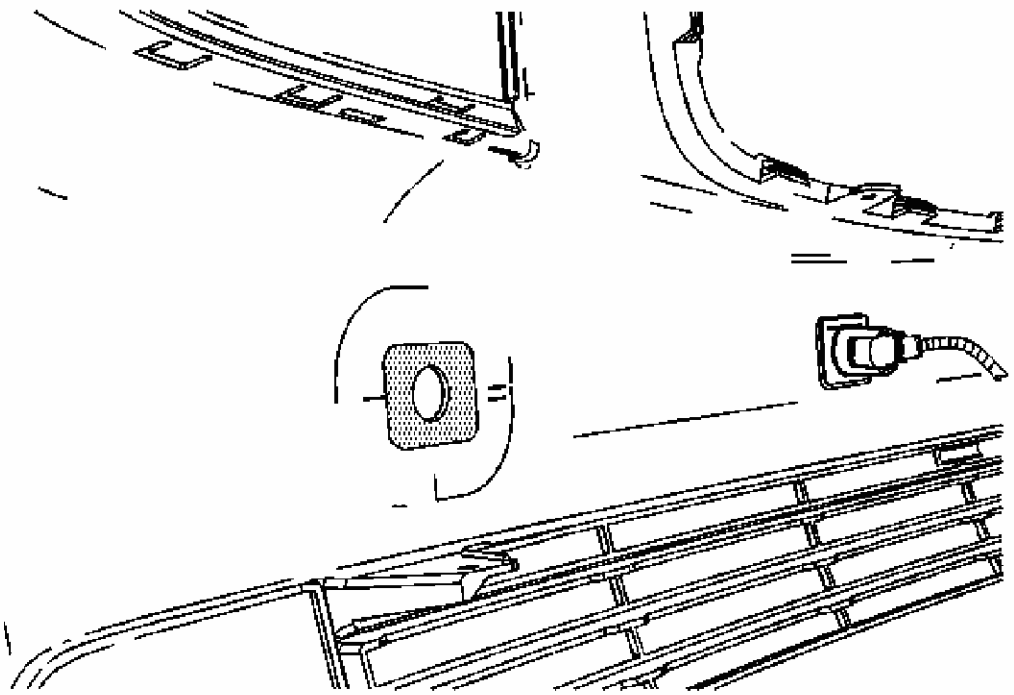

Fig. 16: Sanding/Grinding Sonic Weld Plastic Residue From Fascia
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do Not grind off alignment tabs.

6. Sand/grind sonic weld plastic residue from the fascia.

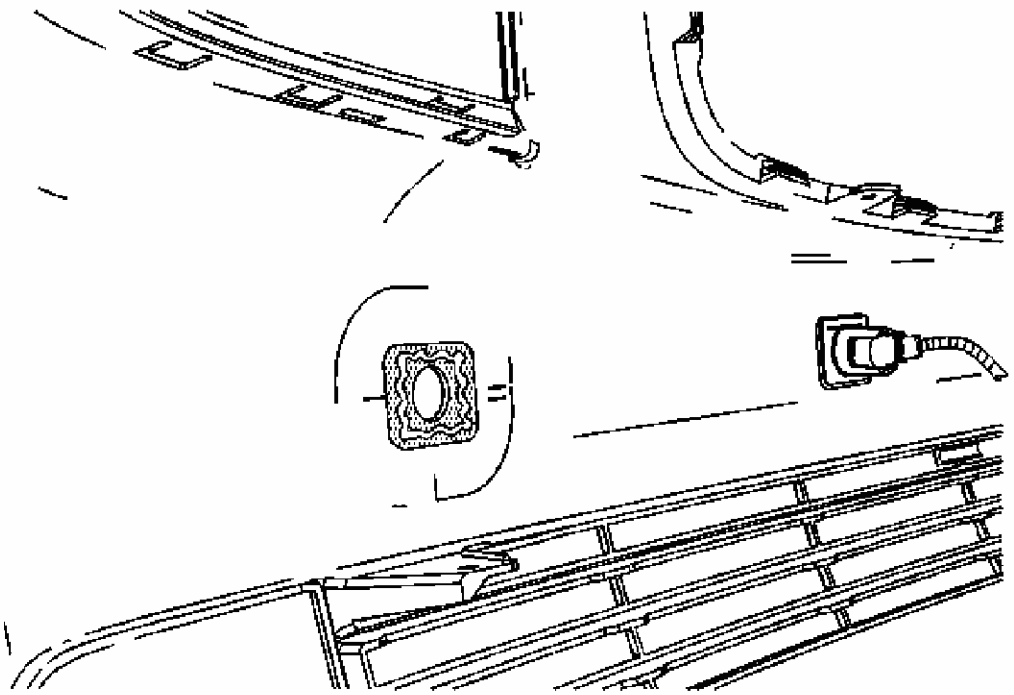

Fig. 17: Applying Structural Adhesive Epoxy To Fascia
Courtesy of GENERAL MOTORS CORP.

7. Apply structural adhesive epoxy, Lord Fusor(tm) 127EZ or equivalent, to fascia at mating surface.

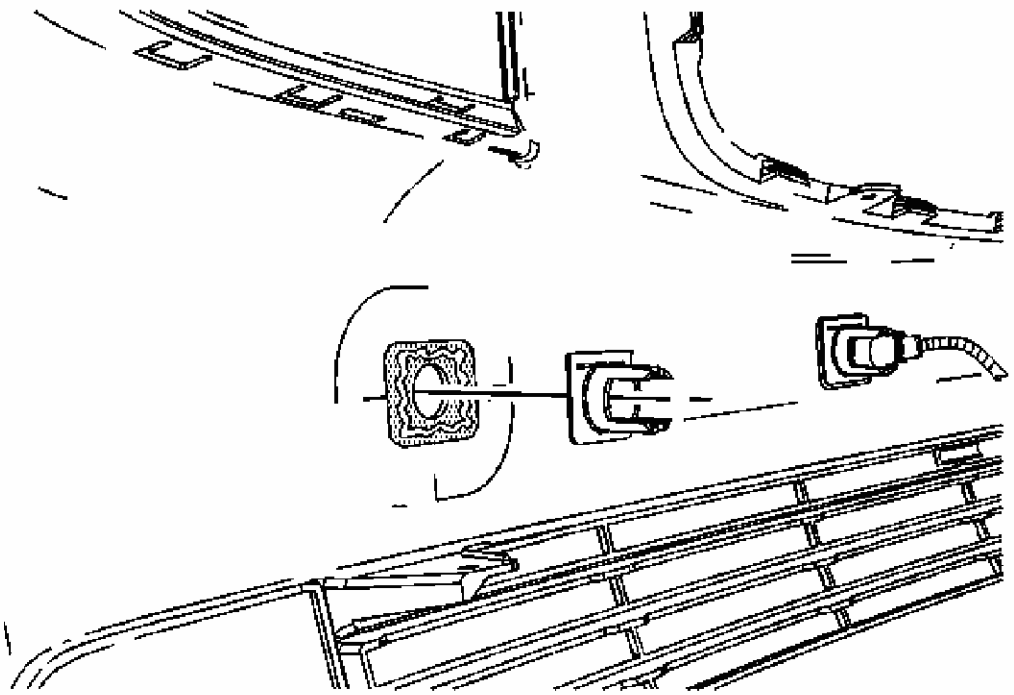

Fig. 18: Identifying Sensor Housing & Tabs
Courtesy of GENERAL MOTORS CORP.

8. Using the alignment tabs, install the sensor housing to the fascia.
9. Allow adhesive to cure according to manufacturer's directions.

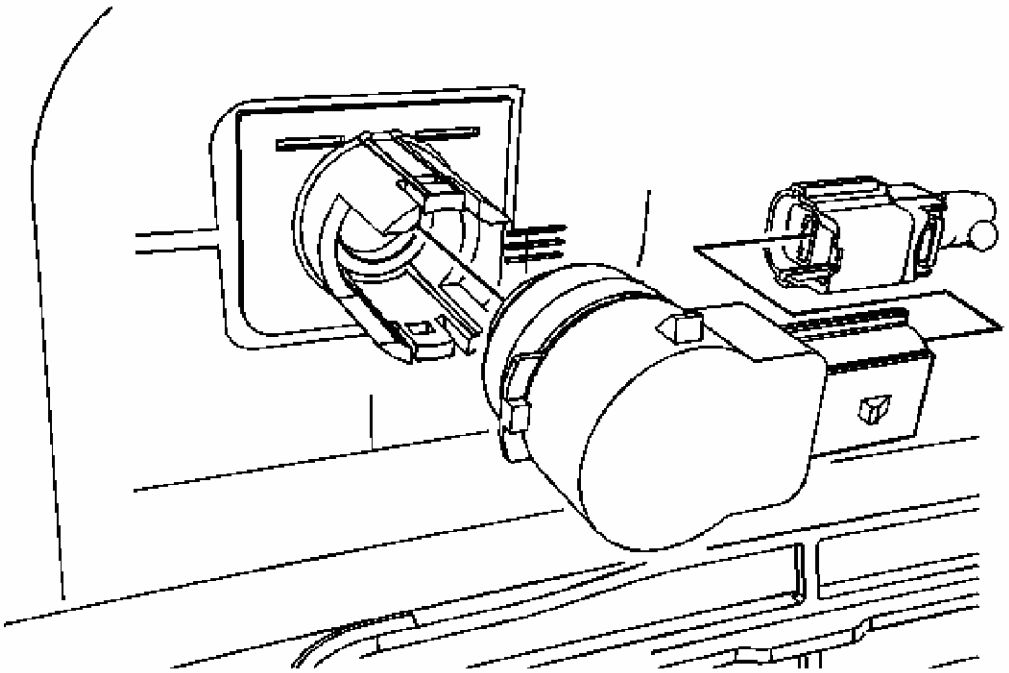

Fig. 19: View Of Rear Object Sensor
Courtesy of GENERAL MOTORS CORP.

10. Install the sensor to the sensor housing.
11. Connect the electrical harness.
12. Install the rear fascia. Refer to **Rear Bumper Fascia Replacement** .

OBJECT ALARM MODULE REPLACEMENT

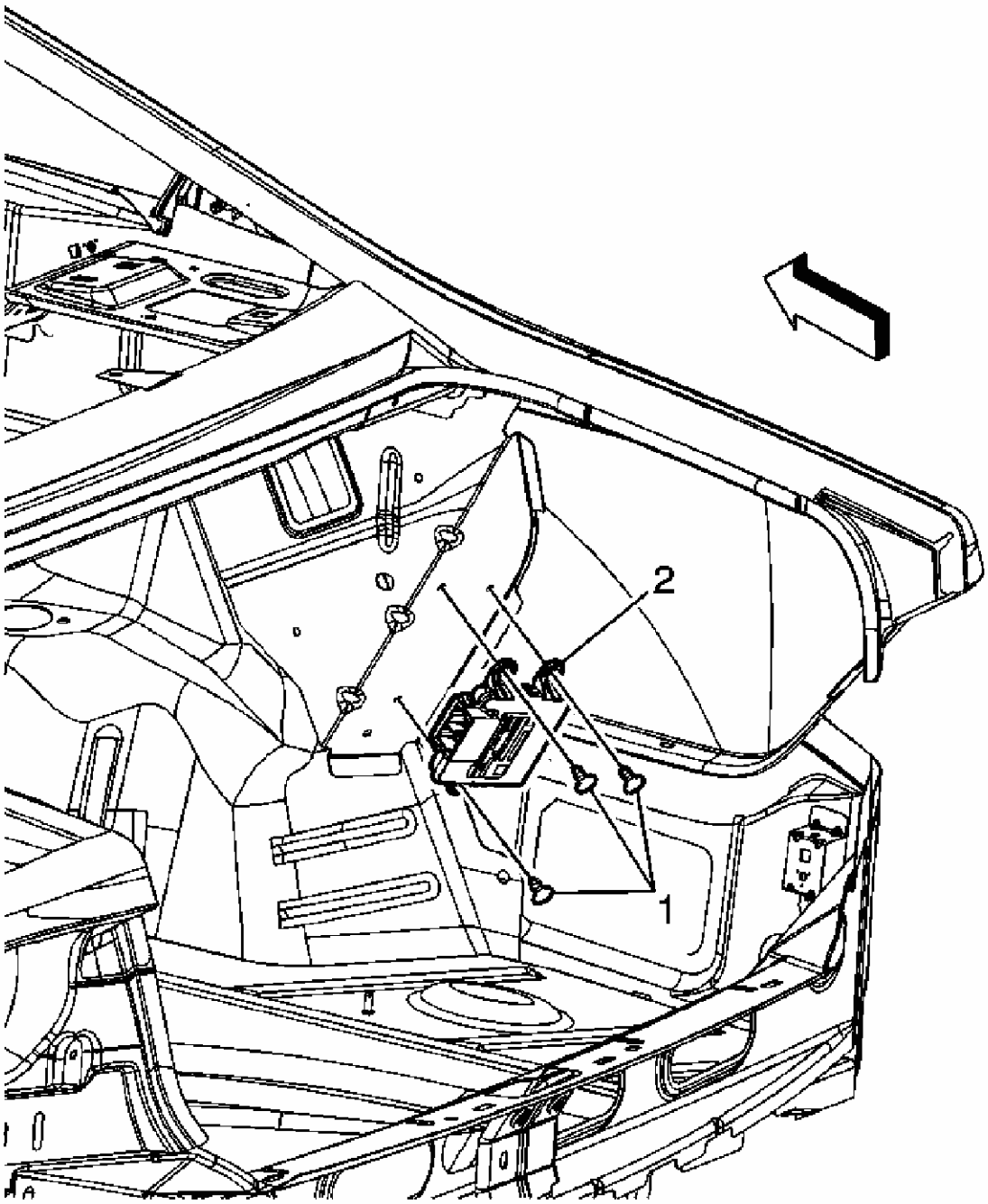

Fig. 20: Identifying Object Alarm Module
Courtesy of GENERAL MOTORS CORP.

Object Alarm Module Replacement

Callout	Component Name
Preliminary Procedures: Remove the right rear compartment side trim panel. Refer to **Rear Compartment Trim Panel Replacement** . Refer to **Control Module References** for replacement and setup information.	

1	Object Alarm Module Push-in Retainer (Qty: 3)
2	Object Alarm Module **Tip:** Disconnect electrical connectors.

DESCRIPTION AND OPERATION

OBJECT DETECTION DESCRIPTION AND OPERATION (REAR PARK ASSIST)

Object Alarm System Description

The object alarm module monitors the distance and how close a vehicle is to an object when backing up in a parking maneuver. The object alarm module will notify the driver of any objects of interest when backing up at speeds less than 8 km/h (5 mph). The distance between a vehicle and an object of interest is monitored by 4 ultrasonic sensors located in the rear bumper of the vehicle. The object alarm sensors receive the echo signal reflected off an object of interest while the vehicle is backing up at speeds less than 8 km/h (5 mph). The object alarm module receives the vehicle speed from the ECM via the serial data circuit. When the backing up speed exceeds 8 km/h (5 mph), the object alarm system is disabled. The object alarm system uses visual displays and audible warnings from the radio speakers to warn the driver of an object of interest within the defined field of view. The BCM controls the object alarm system chime function and sends serial data requests to the radio to sound the chime as needed. The visual display comprises of two amber and one red indicator and these indicators illuminate based on the vehicle distance to the object of interest. When the ignition is ON and the vehicle is placed into REVERSE, the object detection system performs a bulb check on the rear display.

Object Alarm Sensor

The rear object alarm systems are equipped with 4 ultrasonic sensors located on the rear bumpers of the vehicle. These sensors are used to monitor how close the vehicle is to an object. The object alarm sensors receive the echo signals reflected off an object of interest while the vehicle is backing up at speeds less than 8 km/h (5 mph). The object alarm sensor is a 3-wire sensor comprising of the supply voltage circuit, signal circuit and the low reference circuit. Power is provided to the object alarm sensor via the supply voltage circuit from the object alarm module. The object alarm module also provides ground to the object alarm sensor via the object alarm sensor low reference circuit. The typical object detection alarm sensor signal voltage when the system is active is between 7.2-9.2 V.

Information Center Telltale Assembly

The information center telltale assembly visual display comprises of two amber and one red indicator. These indicators illuminate based on the vehicle distance to the object of interest. When the ignition is ON and the vehicle is placed REVERSE, the object detection system performs a bulb check on the rear display. When a malfunction exists in the object alarm

system, the object alarm module illuminates the information center red indicator continuously. The object alarm module provides power to the rear information center telltale assembly. The object alarm module controls the information center indicators by providing ground via the indicator control circuit when active.

Rear Object Alarm Detection System

When the ignition is ON and the vehicle is placed into reverse, the object detection system performs a bulb check. During the bulb check, the 3 indicators on the rear display will illuminate for approximately 2 seconds to indicate that the system is working. The object detection system performs a bulb check and operates when the following conditions are present:

- The ignition is ON.
- The vehicle is placed in REVERSE (R).
- The vehicle speed is less than 5 mph (8 km/h).

  At speeds greater than 5 mph (8 km/h), the rear object detection system is disable. The red indicator flashes to warn the driver that the object detection system is disabled.

Object Detection Alarm System Operation

The object detection system senses how close the vehicle is to an object. The distance is determined by the 4 ultrasonic sensors located in the rear bumper. When the system detects an object while the vehicle is in reverse, one of the following will occur:

- If the object is less than 0.3 m (12 in) away from the vehicle, the amber outside, amber middle and the red outside indicators flash and the chime sounds continuously for 5 seconds.
- If the object is less than 0.3-0.6 m (12-24 in) away from the vehicle, the amber outside, amber middle and the red outside are ON.
- If the object is 0.6-1.0 m (24-40 in) away from the vehicle, the amber outside and the amber middle indicators are ON.
- If the object is 1.0-2.5 m (40-98 in) away from the vehicle, the amber outside indicator is ON with a single chime and this is the first detection of an object.

The object detection system can detect objects 7.6 cm (3 in) wide and at least 25.4 cm (10 in) tall. It cannot detect objects above the level of the roof.

If the object detection system detects a malfunction, the object detection system sends a serial data message to the instrument panel cluster (IPC) to display SERVICE PARK ASSIST on the driver information center (DIC). The chime will sound and the red indicator on the information center telltale assembly illuminates continuously, notifying the driver that a

malfunction exist.

Object Alarm System DIC Messages

SERVICE PARK ASSIST

The driver information center (DIC) displays SERVICE PARK ASSIST when the object alarm module detects a malfunction in the object detection system and sends a request to the DIC for display of the message. The DIC also displays SERVICE PARK ASSIST when there is a loss of communication with the object alarm module.

PARK ASSIST DISABLED

The PARK ASSIST DISABLED message is displayed in the DIC when the object alarm system is disabled due to conditions that disable or inhibit the system. The object alarm module requests the DIC via the serial data circuit to display PARK ASSIST DISABLED when it detects that one of the following conditions is true:

- Object alarm system disabled through DIC vehicle customization feature. Refer to the Owners Manual for more information.
- The object alarm module detects that the vehicle speed is greater than 8 km/h (5 mph).
- Automatic Object induced disable feature such as towing a trailer, bicycle rack.
- The park brake is not fully released.
- An object is hanging out of the trunk.
- The system receives vibrations from a large nearby vehicle or from a heavy equipment such as a jackhammer.
- The sensors are not clean.

2006 Buick Lucerne CXS

2006 ACCESSORIES & EQUIPMENT Object Detection - Lucerne

2006 Buick Lucerne CXS

2006 ACCESSORIES & EQUIPMENT Object Detection - Lucerne